

# Canadian Journal of Psychology

THE JOURNAL OF THE CANADIAN PSYCHOLOGICAL ASSOCIATION

## Volume 7, 1953

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# Canadian Journal of Psychology

## PSYCHIC DETERMINISM, FREEDOM, AND PERSONALITY DEVELOPMENT

NOËL MAILLOUX, O.P.  
*Université de Montréal*

AMONG the many problems encountered in the borderland of psychology, few are more difficult to approach dispassionately than the problem of human freedom. However, for scholars who are genuinely interested in elaborating a scientific synthesis and in furthering the advancement of human knowledge, a modest attempt at a more precise formulation is more attractive than a noisy and too often sterile controversy. In our search for truth, is not the wisest attitude the one proposed by Thomas Aquinas, who recommended that we consider *what* is said rather than the individual who is saying it, and who felt that so much time is needed to collect data for constructive thinking that none should be lost in futile discussions? Truth alone will resist the test of time, and when it is manifested, errors are quickly abandoned.

As a beginning, a clear-cut definition of the various angles from which the problem of freedom can be envisaged will permit us to orient ourselves.

First, there is the metaphysician's viewpoint which may be qualified as *structural*. Regarding freedom as an essential element of human nature, he is not preoccupied with its proper use or functioning, leaving the consideration of these aspects to the moralist or the psychologist, as it were. To him, of course, the individual is immaterial; he does not care whether he is a child or an adult, whether he is normal or psychotic, whether he has a mature personality or an unstable one. In the human will he discovers a universal appetite, which happens to be at the same time determined and free: determined towards Good as an appetite, even determined towards unlimited Good as a universal appetite; but also, however, undetermined, indifferent, free towards any particular sensible good with which it is confronted in the course of earthly existence, this second prerogative being the inevitable counterpart of the first one. Moreover, such determinism and indifference mean neither automatism, nor passivity, but domination. Being endowed with intelligence, man is aware that his appetite is made for the pursuit of Good, and hence derive the phenomena of obligation and responsibility. Also, he is aware that, amidst the multitude of particular goods, he remains



the master of his decisions, and hence arises the necessity of a science proposing the art of deciding well, that is, according to the exigencies implied in the universality of the human appetite. Thus freedom appears as the human prerogative, upon which the whole moral science rests as upon an immediate foundation, playing in its turn the role of an indispensable guide. If we are to avoid missing the end of human life, the one most deeply entangled in our willing, it is absolutely necessary to overcome our initial indeterminacy or indifference and to conform to a rule. As we will see later, such necessity has tremendous repercussions at the psychological level.

Freedom, then, is the basis of moral science. But the moralist's point of view being essentially *normative*, to speak with precision we must say that the subject matter of his consideration is the use, the exercise, or the acts of free will, rather than free will itself. From the start, the moralist makes a clear distinction between the acts over which man has complete control, since they proceed from a deliberate decision and conform to the dictates of reason—*human acts*, and the acts which escape such control and whose causes and motivations do not submit to any rational influence—the *acts of man*.

Of course, the moralist has long been aware of the fact that immaturity, insanity, intoxication, or emotional confusion are apt to deprive the individual of his capacity for deliberate willing, temporarily or definitively, through the blurring of his rational judgement. Also, he knows very well that human behaviour, under such circumstances, becomes more or less rigidly geared to the deterministic functioning of phantasy and impulses. Aquinas goes so far as to say that the greatest mass of human individuals remain immature to the point of never finding in themselves sufficient courage and insight to overcome this determinism of sensuality, and continue to let most of their behaviour be dominated by it.

The moralist, however, whose main task consists in elaborating the norms of man's rational, deliberate, and free activity, cannot be blamed, as he too often is, for neglecting these insufficiencies or deficiencies of the will beyond the circumstances where man remains responsible for them. Would any one blame the logician, busy with formulating the norms of right thinking, for not taking account of the delusional reasoning of the insane, or of the distorted reasoning of the man in the street as he expounds his racial prejudices or his political convictions? Today, we notice an unfortunate tendency to forget that our Christian moral science constitutes undoubtedly the most fascinating scientific synthesis ever elaborated. Anyone who is familiar with the extremely refined description of the efficacious functioning of free will, either in the actual

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exercising of a specific choice or in the habitual exercising of moral virtues, as it is proposed in the *Summa* of Aquinas, can only deplore that such a wealth of knowledge about the possible developments of human nature is so frequently and lightly ignored. Many have come to think that the study of "depth psychology," that is, the study of the most primitive or archaic strata of personality, now buried in the unconscious, is far more important than a deep comprehension of the creative processes taking place at the highest level of our rational consciousness.

This, of course, does not mean that whatever knowledge has been accumulated by psychology can be discarded without great damage. This would be equivalent to sinning against a cardinal virtue so highly praised by the moralist himself: prudence. Since the moral scientist aims at offering to men of all ages and of all conditions the guidance necessary to make the best of their rational resources, he will eagerly turn to psychology as to an indispensable source of information. As is well known, the psychologist's viewpoint is predominantly *dynamic*. Having to unravel and explain the interplay of a whole group of forces in action, he needs to build up for himself a developmental or genetic picture of this functional organization as well as an economical evaluation of the intervening energies.

Now, let us here take the time necessary to consider this viewpoint in as constructive a way as possible, with the hope that our effort will prove profitable to the psychologist, to the moralist, and to all of us who are interested in a deeper knowledge of human nature.

To say that, in its early phase, the science of psychoanalysis was almost entirely preoccupied with the exploration of the unconscious realm of personality, with describing the vicissitudes of the instincts of the id, and with visualizing the various constellations of forces which characterize each step of the infantile development, has become a commonplace statement. This means that we are increasingly aware of the importance of further tasks still confronting us. Through the patient and successful analysis of neurotic conflicts, much insight has been gained into the defensive functioning of the ego, but we are left with a very inadequate understanding of the latter's more normal and essential functions of synthesis and integration. Unfortunately, as Thomas M. French has remarked: "A picture of the ego obtained by a study of its defense mechanisms might be compared to a description of the functioning of a government at a moment when its energies are absorbed in putting down an insurrection. Obviously we see here not the normal activity of the government, but its emergency activity when its existence is being threatened. Similarly in studying the defense mechanisms we are able to observe the activity of the ego only at a moment when its

synthetic activity is struggling against the threat of imminent disintegration"(4).

It is self-evident that a science which emerged from an original and fresh attempt at understanding and resolving various symptomatic reactions could, at first, only envisage psychic functioning from that particular angle. Recently, however, the necessity of a new and broader approach (foreseen and even outlined by Freud himself and his early followers) has become ever more acutely felt in various circles where cultural interests have kept their importance along with therapeutic ones. The "conflict-free sphere of the ego," which Heinz Hartmann (6) so well circumscribed some ten years ago, is just about to be considered as a focal point of observation. We have come to realize that, frequent as they are, conflicts are after all nothing but the accidents of the route, and that what is happening in the peaceful area of the mind is much more important from the point of view of human development. Many are inclined to forget it, because to them peace seems equivalent to a condition of passivity or to the tranquillity of death, while in reality it must be conceived as the condition of normal creative activity. If it implies a relative absence of conflicts, it favours the strenuous efforts of a personality which is in the process of creating itself, as well as the powerful strivings leading to a strongly organized mental synthesis and to an endogenous and dominating adaptation to reality. It is such a positive achievement of the "peaceful mind," namely, the one culminating in the acquisition of freedom, that I intend to describe briefly with the hope of stimulating further interest and research.

No one contemplating for himself a thorough reconsideration of the problem of freedom, at least at the psychological level, can escape being baffled by the confusion surrounding the whole question. Today, in this field, we are just beginning to overcome the usual weakness of our mind which in difficult matters has a strong tendency either to see a reason to doubt where there is only a difficulty to solve or to neglect a real difficulty whenever the issue is certain. So it happens that the ground on which the problem of freedom had to be posed and studied dispassionately soon became the battlefield where the pseudo-scientific, mechanistic, and moralistic orthodoxies met to fight each other without mercy.

Indeed, on the one hand, the moralistic attitude was extremely simple. The close contact which existed between the psychological and moral sciences in their early phases of development (8) had been lost and slowly the legalistic conception of morality had prevailed. Of course, as the moral science became more or less a province of jurisprudence, responsibility tended to be defined almost exclusively in objective terms.

The only condition on the part of the subject which kept its importance was the intellectual capacity to discriminate between good and evil, the awareness of what he was doing and the consent given to such behaviour. Certainly there were "*casus conscientiae*," and casuistry was taking care of them. Unfortunately, we must state that the subjective conditions of the individual conscience remained almost entirely foreign to its consideration. It is a fact that casuistry was mainly concerned with the objective determinations of the moral law, with the existence or non-existence of a certain obligation or with its grievousness. The psychology of the casuist was just as simple as that of the jurist. To both of them, clear self-awareness, personal moral conscience, freedom, and responsibility were primary data. That the many conditions of moral behaviour were realized at any time, if a man were awake and mentally sound, was a matter of evidence; at all hours of the day a man, once he had attained the age of reason, was supposed to enjoy freedom and to behave in a moral and responsible way (10). So long as such an attitude was maintained, the moralistic jurist had no use for psychology and could not avoid considering it as an unwelcome complication.

On the other hand the mechanistic explanations upon which scientific dogmatism relies to maintain its assumption that mind is brain and that freedom is a myth, are no less naive and unsatisfactory. It contends that all psychic events and all behaviour are the effects of causes functioning at the level of physical necessity. Recently Juliette Boutonier, a French analyst, has shown with convincing evidence the futility of the mechanistic attempt to reduce the acquisition of habits and of free behaviour to a mere process of conditioning. Since I cannot insist here on this aspect of the problem I only want to refer those who are interested to her inspiring little book (2).

What seems particularly important for us to mention at this point is that analytic psychology itself, at least if we refer to its most advanced representatives, has finally found a way out of this dilemma on a realistic basis. For the old postulate that all psychic events or reactions are the effects of a necessary cause, it has substituted the postulate that all psychic events or activities necessarily have a cause, even if at first glance they appear to be mere products of chance. As to the attitude of the psychoanalytically minded psychologist in this matter, it can hardly be better formulated than in this passage from Gregory Zilboorg: "There is a characteristic story about Freud. He was asked once whether a man could be held responsible for his dreams, and he answered: 'Whom else would you hold responsible?' There is also Freud's profound sense of respect for reason, which he sought all his life to liberate from the fetters of the infantile, nonrealistic fog of a malfunctioning psychic apparatus.

He wished to secure for man the true ability of free choice, which he thought impossible when the psychic apparatus is not fully integrated and harmonized, even as it is impossible to make the free choice to take part in a race if one is legless, or paralyzed, or ataxic. This striving for the opportunity of free choice is inherent in psychoanalysis. If psychoanalysis does not explicitly accept the postulate of free will, it does not deny it; if anything, it supports it by its striving to liberate man's reason and will from the frailties which his biological, and therefore psychological, imperfections impose on him in his daily life" (11, pp. 333-334). On this point, indeed, one can hardly remain in doubt, since Freud himself expressed his own view quite clearly when he wrote: "... After all, analysis does not set out to abolish the possibility of morbid reactions [in patients], but to give the patient's ego *freedom* to choose one way or the other" (5, p. 27).

These preliminary remarks, I hope, will permit us to see the problem in a better defined perspective and to open new ways for empirical research and progressive thinking. Analytic psychologists have investigated in detail the evolution of human thinking from its early prelogical to its mature rational manifestations, and their observations have been supplemented by the many more specific and more refined descriptions and interpretations furnished by the Swiss school of genetic psychology headed by Piaget. As yet, we see much less clearly how free will develops from the archaic stages of indeterminacy, ambivalence, and automatism. Certainly, we are well aware of the possible contaminations of freedom by such infantile characteristics, as we are aware of the disturbances of rational thinking by symbolic representations. But, through Charles Odier's recent contribution (9), new and abundant light has been shed on this difficult problem which involves the whole genesis of moral life. At this moment, then, an attempt to circumscribe the various conditions implied in the emergence and the functioning of freedom would seem particularly important.

To clear the ground from the start, we must say that the formulation of the question of the relationship between determinism and freedom has been entirely misleading. In fact, as long as the thesis of physicalism, either in the form of behaviourism or of operationism, was triumphant in psychology, physical determinism was accepted as a scientific dogma. Moreover, such determinism was regarded as the alternative of free will. It is rather amazing that such a gross confusion could persist so long in the mind of many scientists and philosophers. Here let us remember that the real alternative to determinism is not free will but, as Robert P. Knight so precisely expressed it, "indeterminism, which implies chaos, unpredictability, and a denial of cause and effect relationships in human affairs" (7).

Now it is apparent that the first stage or development in this direction consists in the overcoming of primitive indeterminacy, which is a constant source of painful anxiety. And during this early period this can be achieved only through the mechanization or automatization of psychic processes, which is equivalent to the establishment of the regime of psychic determinism. Long ago, Franz Alexander not only recognized in this mechanization one of the primal characteristics of the psychic apparatus, but also grasped very well what advantage is accruing to the psychic apparatus from it. "Consciousness," he said, "is relieved of the task of the psychic elaboration of instinct, it is spared the development of anxiety with which the recall of the painful memory is associated, and is thus freed of the conflict between temptation and anxiety" (1, pp. 10-11). To be sure, at this level habitual human behaviour, being deprived of the ideal pre-conditions of conscious motivation and of adequate testing against reality, inevitably displays the characteristics of extreme rigidity and of schematic adaptability. Nevertheless, since it is oriented, structured, and organized, it can be exercised with a feeling of relative security.

But the stage is soon reached where this rigidly deterministic functioning appears to be too narrow a basis for adequately adaptive behaviour. Once the child is challenged by his personal discovery of values, he experiences the thrill of initial freedom, he feels capable of conquering his autonomy, he realizes that freedom, being an instrument and an end, has to conquer itself. At the same time, his painfully acquired security is shattered, and he finds himself compelled again to face complete indeterminacy. It is no wonder then if anxiety—rightly called the emotion of the possible—reappears, and is felt more acutely than ever, and even threatens a still unstable equilibrium. No one could stress too much the importance of the fact that anxiety is present with particular intensity before the infantile mechanization of the psychic processes, before the final crystallization of neurotic symptoms, and before acquiring the ability of mature free activity. As Juliette Boutonier (3, pp. 276-305) rightly affirmed, anxiety finds its fundamental root in indeterminacy or possibility, and it can be overcome only through the alternative of the rigorous determination of necessity or of the autonomous determination of freedom. As we all know, man will experience anxiety particularly when, more or less liberated from the grips of necessity, he still has to struggle hard for the acquisition of freedom, simply because he is after all taking the risk of losing what he has, without obtaining what he wants. Here, however, I am not suggesting that no unconscious elements will remain in the newly elaborated function of free will. Even if it pertains to the highest level of human activity, it must be regarded as the completion of a whole hierarchy of functions, which it does not

suppress but integrate, which are still used even if surpassed (2, pp. 53-54).

It is now becoming clear enough that psychic determinism, far from being opposed to freedom, is a necessary step or condition for its acquisition. Moreover, it cannot be surpassed without being integrated, since freedom can no more be exercised without using psychic automatisms than without using biological ones. It is only in the case of a neurotic condition that, because of the lack of integration, these two levels of functioning will appear as conflicting, the lower one maintaining its autonomy. After what has been said already, it seems easier to introduce here a few other considerations about the psychological nature and the evolution of free activity which have important clinical implications.

Free activity, corresponding to the most perfect activity of which man is capable, is certainly the one in which less is left to indeterminacy and unpredictability. In other words, such behaviour is fully controlled precisely because it is fully determined, because it constitutes the most adequate and accurate answer one can give to the more or less complicated set of demands imposed by reality at a certain moment. It is quite easy to observe that the more one has developed some particular skill and can master a given situation, the more he takes account of even its minutest details. Each aspect of his activity corresponds to a definite element of reality and finds in it its ultimate determination. The more complex the situation to which we have to adapt, the more necessary it is to surpass the gross and rigid determination secured through mechanization or automatization. The extremely precise adaptability of the artist, of the craftsman, of the professional player, requires nothing less than the plasticity of free determination—free, because it has to be complete.

But, as free determination implies self-determination, what we call free activity is nothing other than self-determined activity. This means that such activity, far from losing the advantages gained through determination, namely, intentionality, structurization, and organization, possesses the additional property of extreme flexibility, which makes it possible for it to respond synthetically to situations as varied as they are unique. Again, this point of view has been briefly formulated by Robert P. Knight who writes: "That man is free who is conscious of the law that he obeys, who is capable of acting according to standards which he accepts" (7). This man, of course, instead of being determined by any particular motivation, is himself actively determining that particular motivation which will be the spring of his individual action. Moreover, he remains capable of changing it at any time.



Obviously, self-determination implies the highest level of consciousness, that is, the only one where deliberation and choice can take place. In fact, any free activity is one which proceeds from deliberate willing, or whose motivation has been rationally elaborated. It presupposes, then, a clear perception of the relationship existing between end and means, and the ability to explore, invent, or create the means leading to the desired end. In short, as science facilitates inventiveness and originality of vision, freedom facilitates creativeness and originality of action. And here we are reaching the root of an old misunderstanding which has been a very serious obstacle to the development of psychology. Because creativeness and originality, which are the characteristics of free activity, were confused with indeterminacy, freedom came to be synonymous with unpredictability and was discarded from the realm of science. It took all the work of men like Bergson and Max Scheler to rehabilitate freedom in the eyes of science. Now, it is more and more clearly understood that free behaviour, far from being unpredictable, is the most predictable, but not predictable in the same way as behaviour which is the result of a deterministic process, or of a repetition compulsion. Confronted with a difficult and problematic situation, the man who is really free is the only one who is entirely reliable, the only one whose behaviour remains predictable, because he is the only one capable of making the right choice and of executing it. On one hand we always know that this man is going to do the only thing which has to be done, namely the right thing; but, on the other hand, we also know that such an achievement escapes our prevision as any genuine discovery.

At this point, we are in a position to present an empirical description of the various attitudes towards freedom and responsibility as encountered in clinical practice.

First, let us consider the case of the neurotic individual. Obviously we have to do with someone who is overwhelmed by the fear of responsibility. Far from facing the risks of free choice, he tends to fall back on passivity and insists that he be told what to do. Actually, he lives with the uncomfortable feeling of being locked up within the grips of some unknown necessity, and his experience of freedom is painfully limited. Almost continuously, he is complaining about actions or gestures over which he recognizes with more or less insight that he has practically no control. Let us recall here the reactions of the scrupulous man. His immense fear of responsibility reveals to us clearly how much he wants to be reassured about his incapacity to behave otherwise than he actually does. He spends most of his time persuading us that his will is not the determining factor of his behaviour, that his consent has nothing to do with gestures escaping his control, that his conduct bears some

resemblance to a series of reflexes. *His fear of being responsible for doing something sinful inhibits his willing to be capable of accomplishing something good.* In other words, the risk of freedom appears to him so full of danger that he shies away from it. His increasing inferiority induces him to deny, if not to destroy, his most effective potentialities through not having to use them any more, and causes him to seclude himself in a more or less complete passivity.

On the other hand, it is easy to observe that the case of the one who does not make the effort of developing a strong personality, but abandons his behaviour to what might be called the regime of characterological automatism, is far less serious. Confronted with a choice between good and evil, he feels free and essentially accepts responsibility. But if we compare him with the one who has acquired full-fledged freedom, he seems like a student repeating mechanically the half-assimilated content of his textbooks rather than like an original thinker, ready for autonomous undertakings and personal discoveries. His freedom still presents evident shortages and hardly embraces the minimum essential content of its scope. Its influence does not make itself felt to the point of introducing a delicate tint of rationality, even in the moving circumstances of the human act, thus contributing to its full perfection. On the moral level, we are dealing with an individual who is satisfied with exerting his free-will capacity only halfway and whose behaviour remains characterized by the lack of precision and adaptability inherent in a conventional and formal gesture. At best, this individual will usually do *what he must do*; but he will seldom do it *the way he should do it*. From the point of view of the moralist, he will appear rude and still unskilled in the art of autonomously determining for himself the ways of virtue—the art in which freedom finds its highest manifestation and which is called prudence.

Now let us conclude with a brief clinical description of the individual who has reached the heights of freedom and who has acquired what is usually called a strong and mature personality. As the scientist whose intelligence has mastered a whole sphere of knowledge does not claim infallibility but assumes the full responsibility for his formulated hypotheses, the free man whose will has mastered the art of autonomous choice does not claim impeccability but is the only one to face the total responsibility of his acts. If he becomes aware of a slight deviation from the dictates of reason in his behaviour, he will not try even for a moment to minimize it or to excuse it. As the only way to the acquisition of knowledge consists in continuously recognizing one's errors and in modestly attempting to correct them, the only way to the acquisition of freedom consists in the courageous humility of the saints, this humility which makes them capable of facing in themselves the reality of sin.



The psychologist frequently feels frustrated when he tries to pierce the strong armor of narcissism in his patients and invites them to drop the fetters of infantilism, so that they can acquire the mere capacity to choose one way or the other. The task of the priest, in a world which praises above all else earthly success and domination of the weak, is incredibly harder: he must break through this terrific armor of pharisaic pride—"Thank you, O Lord, that I am not like this man! . . ."—which even Christ has at least temporarily failed to pierce; he must invite men to drop the fetters of their sinful propensities, desires, and ambitions, so that they can acquire not only the mere capacity to choose one way or the other, but the capacity to choose the way leading to the highest good, to choose the way of perfect freedom, which, as St. Augustine puts it, expresses itself in the most perfect love, in Christian charity. "Ama, et fac quod vis! . . ."

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# THE DISCRIMINATION OF SUBLIMINAL VISUAL STIMULI<sup>1</sup>

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## INTRODUCTION

UP TO THE PRESENT psychological experimentation has been concerned largely with the more easily observable aspects of human behaviour. A thorough understanding of behaviour cannot be achieved until more is known about those discrete inner processes which have been designated arbitrarily as belonging to the unconscious. The study of unconscious aspects of experience has been relatively neglected, in a practical sense, and has been confined mainly to the realm of theory. This deficiency is not the fault of the research worker, but is due rather to the nature of the unconscious processes themselves. They are so intimate to the individual personality that they are not conducive to normal laboratory experimentation.

There is now good reason to believe, in view of new developments in the area of subliminal stimulation, that ways of exploring and dealing with some unconscious processes in the laboratory setting are being developed. The recent study of Lazarus and McCleary (3), "Autonomic Discrimination Without Awareness," has indicated that it is possible for the individual to distinguish threatening from non-threatening stimuli in spite of the fact that he is unable consciously to identify the stimulus to which he is reacting. In order to avoid the controversial implications of "subconscious" or "unconscious perception," the authors have coined the new term "subception" for this perceptual process.

In their experiment, Lazarus and McCleary conditioned the galvanic skin response to five of ten nonsense syllables. Later they found that the conditioned GSR was still present even though tachistoscopic exposure rate had been speeded up to the point where the subjects could no longer identify the syllables correctly. This method has been particularly important in suggesting a technique by which the conditioning of an involuntary response to subliminal stimuli might be attempted. McGinnies (4), in his study of perceptual defence, suggested that conditioned emotional reaction to various symbols plays a dominant role in the individual's perceptual filtering of inimical or pleasant stimuli in accordance with his needs.

<sup>1</sup>This study constitutes a thesis submitted, in 1952, in partial fulfilment of the requirements of the Master of Arts Degree in the Department of Psychology at the University of Toronto. The writer wishes to express his gratitude to Mr. L. Gelfand for his assistance with the technical apparatus which made this study possible, and to Professors E. W. Bovard, Jr., and D. C. Williams for their advice and counsel.

Several attempts have been made in the past to condition various responses to subliminal stimuli as a means of demonstrating that the human organism is capable of responding to stimulation so weak that it cannot be perceived consciously. Cason and Katcher (2), in 1933, were unsuccessful in an attempt to condition breathing and eyelid responses to subliminal electric shock. In the same year, Newhall and Sears (5) conditioned finger-withdrawal to supraliminal light stimuli. Stimuli below the statistical limen, and in a few cases stimuli reported as unperceived by the subjects, also evoked the appropriate responses. However, Newhall and Sears remained uncertain whether a conditioned response could occur without consciousness of the stimulus. In 1935, Silverman and Baker (6) reported failure in their attempts to condition increase in breathing, foot pressure, and eyelid responses to subliminal shock. In a later experiment, Baker (1) reported that he had succeeded in conditioning pupillary response to subliminal auditory stimuli. This finding, however, was not substantiated in a reduplication of Baker's procedure by Wedell, Taylor, and Skolnick (7), in 1940.

Outright failure or the dubious results obtained in the above experiments may be due, partly, to the types of responses (for example, eye wink, increase in breathing, finger withdrawal, etc.) which the experimenters had tried to condition to various stimuli. Probably the most suitable type of response for conditioning subliminally is involuntary, since involuntary responses are comparatively less subject to conscious factors. Another reason for failure in some of these studies may have been that the unconditioned stimuli used were subliminal (for example, subliminal shock, sound, etc.) and did not constitute a sufficient threat to the organism; therefore they failed to elicit the appropriate responses which were to be conditioned. In the present experiment an attempt has been made to overcome the above-mentioned difficulties. The response which has been selected for conditioning is an involuntary one similar to the galvanic skin response. The unconditioned stimulus used is supraliminal electric shock which, in pilot studies, was found to elicit the appropriate electrical skin responses.

The major purpose of this investigation is to condition an autonomic response (in this instance an electrical skin response similar to the GSR) to subliminal visual stimuli. These stimuli are judged to be subliminal only when the subjects cannot identify them at all and cannot make a verbal report. A finding that subliminal conditioning is possible would reinforce the evidence of Lazarus and McCleary in favour of their "subception effect," and would provide an experimental instance of conditioned emotional reaction relevant to the problem of perceptual defence as investigated by McGinnies in 1948.

## PROCEDURE

The response which was selected as an index of emotionality in the present study has been called an electrical skin response. This is similar, in principle, to the galvanic skin response, since it involved the passing of an electric current (AC) of less than one volt between two electrodes (brass thimbles) placed upon the left forefinger and middle finger of the subject. This was accomplished by feeding a 500 CPS sine wave (1 volt) into a General Radio Co. 650-A Impedance Bridge set at the capacitance function (the selector switch was set at the CDQ position with the DQ power-factor dial set at 10). The main dial (CRL) was adjusted for null point. The null point was indicated on a Hewlett-Packard Model 300-A Harmonic Wave Analyzer adjusted for minimum band width and tuned to the oscillator frequency. Frequent adjustments were made, since the electrical skin changes showed best when adjusted for null point. A deflection of the needle from null point on the dial of the Harmonic Wave Analyzer was considered a response indicating that electrical skin changes had taken place within the subject. The relative magnitude of the responses could not be taken into account, since the accurate measurement of the changes in the subject's skin resistance alone (capacitance and inductance were also involved) was not possible with the available equipment.

The supraliminal electric shock was administered by means of electrodes, similar to those used on the left hand in detecting the electrical skin changes, placed upon the corresponding fingers of the subject's right hand.

Eight subjects in all, five male and three female, graduates and undergraduates in Psychology, participated in the experiment. The visual stimuli which were to be presented subliminally consisted of four slides of single figures (a square, a circle, a triangle, and a rectangle), and two slides of double figures (a square and a circle, and a triangle and a square). These figures were presented subliminally by means of a projection tachistoscope capable of shutter speeds from one second to 1/100 second and equipped with a variable aperture which made it possible to reduce the illumination as desired.

*Determination of the Sub-threshold Level*

In accordance with the criterion that the visual stimuli were to be considered subliminal for the subject only when he failed to identify the stimulus and could not make a verbal report as to its nature, the following procedure was adopted with each subject: two slides of different figures (Figure 1) were tachistoscopically exposed supra-liminally so that they were correctly identified by the subject. Shutter

speed was increased to maximum (1/100 second) and illumination was reduced through successive exposures until the subject made consistent errors in identifying the two stimuli. At this point a third slide, Slide 3 (See Figure 1), was introduced, which the subject failed to identify correctly. Illumination was further reduced gradually in succeeding trials until the subject reported that all he could see at each exposure was a flash of light. When he was forced to make some sort of an identification he admitted guessing and was more often wrong than right. It was now presumed that the level had been reached where new stimuli could be introduced which the subject would be unable to identify or report on verbally, and which would be subliminal.

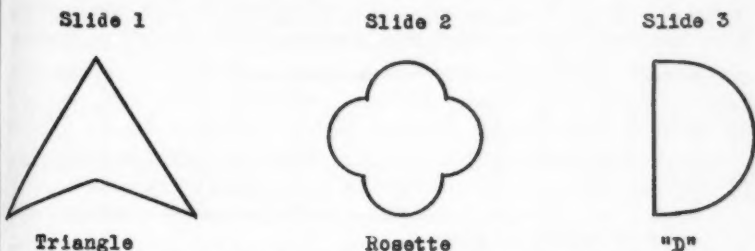


FIGURE 1. Slides used in determining the sub-threshold level. (Slide 3 was introduced after the subjects made consistent errors in identifying Slides 1 and 2.)

### Experimental Trials

During this part of the experiment the six slides of geometric figures (of which the subjects had no prior knowledge) were tachistoscopically exposed in six series of 28 presentations each.<sup>2</sup> (See Figures 2, 3.) For any one subject the 28 presentations in a single series consisted of four presentations of each of the five non-reinforced stimuli plus eight presentations of the reinforced stimulus. The method of randomization was used to determine which figure (or slide) of the six was to be reinforced by supraliminal shock for the particular subject, and also to determine the order of presentation of the slides within each series of 28 exposures. The reinforced slide appeared eight times in each series, or twice as often as any other single slide, and was reinforced by shock upon each presentation. The over-all ratio of the reinforced to the combined non-reinforced slides was 2 : 5.

A five-second interval was interposed between the subliminal presentation of the stimulus and reinforcement by supraliminal electric

<sup>2</sup>The first of these series has been considered a period of familiarization with the experimental procedure and has not been considered in the results.

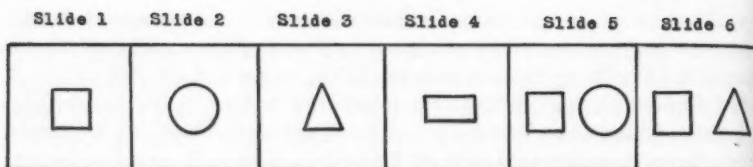


FIGURE 2. Six slides used in the experimental trials.

shock and/or removal of the slide.<sup>3</sup> During this interval the subject's electrical skin changes were recorded. It was found that these changes occurred from two to four seconds after the tachistoscopic flash and were observed as a deflection of the needle from null point on the dial of the Harmonic Wave Analyzer. These changes in skin conductivity were thus considered as anticipatory reactions to the shock presentation.

Slide No.	6#	2	3	4	6#	1	2
Response	1	0	1	0	1	0	1

# the reinforced slide

FIGURE 3. Sample of recording material (taken from Series IV, Subject 8).

The experiment was thus essentially a matter of determining to what extent subjects would correctly anticipate, in this sense, the shock that followed five seconds after presentation of the reinforced slide at a subliminal level. Since the only cue to occurrence of the shock was presentation of the slide associated with that shock, at a level of illumination and tachistoscopic speed that ensured a stimulus effectively below the visual threshold, it can be presumed that if the subjects as a whole correctly anticipated, in terms of electrical skin changes, the occurrence of shock on a greater proportion of occasions than could be expected by chance, they were using this cue for shock presentation and were thus making discriminations at the sub-threshold level.

The subjects were instructed to attempt to identify each slide through-

<sup>3</sup>The changing of the slides was audible to the subjects. In a pilot study it was found that the command "Ready" aroused electrical skin changes which tended to obscure those following the exposure of the slides. This effect was eliminated by instructing the subjects to take their cues concerning when slides were ready for presentation and the termination of the five-second interval, from the sounds made by the slide-holder of the tachistoscope being pushed in or pulled out. In certain cases this auditory stimulus produced a recordable response; in all such cases this response was immediate and minimal and the deflection observed returned to the null point *before* the visual stimulus was presented. Therefore "response" in this study refers only to recordable responses to the visual stimulus.



out the experimental trials but were requested to withhold their verbal report until the termination of the five-second interval, since it might obscure the skin changes which followed presentation of the slide. If identification was impossible, the subjects were further requested to make no verbal report at all, since some subjects tended to report a flash of light at each exposure. During the complete course of the experimental trials, of which there were 1,120, only four verbal reports, two of which were accurate,<sup>4</sup> were made, indicating that the stimuli were substantially below the subjects' thresholds. Further reductions in the illumination eliminated even these responses.

Upon completing the six series of experimental trials, the three figures originally used in determining the sub-threshold level of operation were again presented to the subjects at the same shutter speed and intensity of illumination as obtained at the end of the experimental trials. In no case did the subjects identify any of the figures. These procedural checks (namely, the above procedure, and the procedure adopted in determining the sub-threshold level of operation for each subject before the experimental trials), as well as failure to identify the stimuli during the experimental trials, suggest that the stimuli used were substantially below the thresholds of the subjects.

### RESULTS

The general hypothesis of this study, namely, that an electrical skin response can be conditioned to subliminal visual stimuli, is supported by the data. As Table I indicates, a significantly greater proportion of electrical skin responses occurred following subliminal visual stimuli which were reinforced by supraliminal electrical shock than occurred following subliminal visual stimuli not so reinforced.

On testing the assumption that no real difference exists between these two proportions, it was found that the probability of the obtained difference arising through chance fluctuation of the data was approximately .0006.

The probabilities for each subject's results were separately calculated, and it will also be noted in this table that, although the general hypothesis is confirmed by the over-all data, these individual results were not statistically significant, except in one case (S8). It was not expected, in this experiment, to be able to demonstrate successful subliminal conditioning at the individual level, but rather it was expected that this conditioning would be shown in the form of a tendency among the subjects to respond proportionately more often to the reinforced subliminal stimuli than to the non-reinforced. There was only one exception to this general trend, S4, who made only six responses in all. It was noted

<sup>4</sup>These two accurate identifications, made by the same subject (S7), involved a figure (the triangle) which was not being reinforced for this subject.

TABLE I  
ELECTRICAL SKIN RESPONSES OF EIGHT SUBJECTS TO REINFORCED  
AND TO NON-REINFORCED SUBLIMINAL VISUAL STIMULI

S	Total responses	Total reinforced stimuli N	Responses to reinforced stimuli n	Prop.	Total non-reinforced stimuli N	Responses to non-reinforced stimuli n	Prop.	Diff.	SE <sub>D</sub>	CR	P
1	19	40	8	.20	100	11	.11	.09	.0705	1.27	.20
2	46	40	16	.40	100	30	.30	.10	.0900	1.11	.27
3	73	40	23	.575	100	50	.50	.075	.0927	.81	.41
4	6	40	1	.025	100	5	.05	—	.0329	.76	.45
5	29	40	10	.25	100	19	.19	.06	.0789	.76	.45
6	48	40	19	.475	100	29	.29	.185	.0911	2.03	.04
7	24	40	8	.20	100	16	.16	.04	.0731	.55	.58
8	89	40	34	.85	100	55	.55	.30	.0752	3.98	.0001
Totals for group	334	320	119	.371	800	215	.268	.103	.03	3.4	.0006



that his characteristic responses to maximum shock were very slight in magnitude when they did occur. For this reason, it was thought that the apparatus may not have been sufficiently sensitive to register his electrical skin changes, if they did in fact occur.

#### DISCUSSION

Demonstration of subliminal conditioning indicates that an elementary form of learning can take place at some level other than the conscious. A neutral subliminal visual stimulus, accompanied by supraliminal shock in the course of the conditioning trials, was found to arouse an emotional reaction (as was shown in the subjects' electrical skin responses) similar to that caused by the actual threat (shock). Somehow the subjects learned which one of six "subceived" stimuli was shortly followed by shock, and reacted accordingly.

Conventional conditioning procedures with adult human subjects are limited in their application, since conscious factors intervene to obscure the process. The conditioned response is considered by many psychologists to be too simple and obvious a form of learning in human subjects for it to play a very large role in human behaviour. This may be quite true of consciously learned behaviour, but may not be so with regard to emotional behaviour. McGinnies, in his study of perceptual defence, has suggested that emotional reaction conditioned to various symbols determines the manner in which we respond in terms of our acceptance or rejection of them. This acceptance or rejection occurs without our being aware of how it comes about. It is effected by means of the process of "subception" which allows *a priori* emotional evaluation of the stimulus and the raising or lowering of the perceptual threshold before conscious appreciation is possible. The effect of raising the threshold, for example, is to prevent an unpleasant stimulus from entering consciousness where it might cause us anxiety.

The present study on subliminal conditioning is basically in agreement with McGinnies's position in that the subjects could make *a priori* evaluation of the neutrality or threatening nature of a subliminal stimulus which was "subceived" and that the emotional reaction following this evaluation could be conditioned. Further, the study indicates that we may become emotionally conditioned to aspects of our external environment which are not available to our conscious processes.

The hypothesis that sensory stimuli which have unpleasant connotations for the individual may be hindered or often prevented altogether from becoming conscious by raising the perceptual threshold, may have implications for the concept of repression. A similar process may prevent ideas, unpleasant or inconsistent with the conscious self-picture, from entering consciousness.

In this discussion of perceptual defence, several interesting questions arise concerning the mechanism by which the variation of the threshold is accomplished. Is this process mediated by higher centres? Is it the result of the autonomic activity following the "subceiving" of threat? It may be that the negative emotions such as rage and fear are followed by a general reduction in sensory acuity. It would follow, then, that when the more pleasant emotions are experienced the opposite reaction would occur and sensory acuity would be increased. If this is so, then there would seem to be a physiological explanation for the brighter appearance of our environment when we are happy.

#### SUMMARY AND CONCLUSIONS

Eight subjects were tachistoscopically presented with stimuli, slides of geometrical figures, which were substantially below their visual thresholds, as was shown in their failure to identify the stimuli. One slide out of the six used in the experimental trials was reinforced on its every appearance by supraliminal electrical shock after a five-second interval. Electrical skin changes of the subjects that occurred before the reinforcement or non-reinforcement were recorded. Statistical analysis of the electrical skin changes that occurred following subliminal visual stimuli shows that a proportion of responses significantly greater than could have been expected by chance occurred following presentation of the reinforced stimuli, in contrast with the proportion which occurred in response to the stimuli which were not reinforced. This indicates that the subjects, as a group, were able to make sub-threshold discriminations.

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## AUTHORITARIANISM IN EDUCATION

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MANY of the difficulties that children have to face in the classroom come from authoritarianism—the authority of the mature individual over the immature, of the community over the individual, of government over society. In the multiplicity of authoritarian agencies one thinks sometimes the child has hardly the will to breathe.

Authority in education in our country has come from a number of sources.

The first source is government. The history of colonial autocracy, and later, self-appointed oligarchy, was followed by authoritarianism in every provincial government, and authoritarianism was reinforced in no department more strongly than in the Departments of Education. "Authorized" has been until recently a word frequently used in official literature, and at the same time, has been frequently stultifying. From the Provincial Government to the municipal school board and through the municipal school board to the principal of the school, and from him to the teacher in the classroom, and by inculcation from the big boy in the class to the little boy in the class, the tradition of authoritarianism in education has set up its forms and moulds, into which we have tried to pour, and through which we have tried to fix, things as fragile and ineffable as ideas on the one hand and the personalities of children on the other.

The second factor in authoritarianism lies in the traditions of education itself. The "master" and the "headmaster," "mistress" and "head-mistress" are extreme terms of authority. In a birch rod in the master's hand and a raised dais upon which to stand we have not only the symbols but the concrete facts of authority. The tradition of authority in education is probably not as strong as it used to be, but it is still so strong that in the majority of classrooms in Canada, as one walks through the corridors of our schools, one would assume that the prime factor in learning is silence, and that quiet obedience is the way to responsible citizenship.

A third source of authoritarianism lies in our culture. Our minds are bound round with superstition and prejudice. To us the book is not only the word, but the last word, unless it contradicts the folklore in which we have been tutored. The paradox of a free, independent society, permitting its collective mind to be cast in the mould that was fashioned by autocracy, can be resolved only when one recalls that freedom of the mind is found only in tranquillity, and the lives of most Canadians during the last 300 years have been too concerned with blasting rocks and felling forests to be able to dwell long among those abstractions in which freedom may be found.

A fourth source is ego. Many teachers seem to think that when the Normal School principal handed them their certificates, he implicitly said "for thine is the power and the glory" and in the classroom they relish the power which God forgot to give them in their normal personalities. Even the owner of a dog experiences a fine quality of ego-elation when the dog obeys his various commands. And many a teacher's ego finds a sure satisfaction in a class that fumbles along in the learning process at her command. A large proportion of the physical punishments that children have endured in school and still endure in school have been for the power, if not the glory, which the teacher experiences when he whips a child.

A fifth source of authoritarianism, and the last that I shall suggest to you, is downright ignorance. Many school officials and a host of teachers simply do not know that a child never learns what a teacher teaches him, but rather that the child applies to the content of the teacher's presentation his own creative faculties and comes up with a learning consequence which would amaze the teacher if she could only discover what the child had actually learned. Seldom does one meet a teacher who understands that her world is not the child's world, that in every classroom there are as many worlds as there are children, with the teacher standing in a world of her own; and that to recreate the child's world in the pattern of her own is a psychological impossibility. Yet how many teachers attempt it! The result is far worse than confusion. It is nothing less than destruction of two worlds, both the child's and the teacher's. Most of the neurotic symptoms that teachers display are due to the frustrations that they endure in attempting the impossible. The effect upon the child fortunately is much less severe. He has a brand-new world to create, and in spite of authority and dictation he builds it his own way. His world that might have been, however, if he had had an understanding teacher, is destroyed, and the later social consequences are reflected in the regeneration of patterns of human suffering.

Authority in itself is not all bad, but is good or bad, like so many other things, only as we make it so. Out of authority comes conformity, and in conformity society finds its continuity. In conformity also, the child finds his intellectual and emotional security. From authority also comes uniformity, and uniformity gives society its coherence, creates homogeneous social substance out of a heterogeneity of individuals. These are good things. Through conformity civilization relates what has been to what is to be, and through uniformity the race has risen out of anarchy into a number of social integers.

How, then, may the classroom teacher resolve the anomaly of authority which is at the same time creative and destructive?

On paper and by theorem, the problem is more difficult than any other in education. It is the problem of the part in relation to the whole, of the individual in relation to the social structure, of personal freedom and the social mores, of individual need and standards of ethics. One might say, in the language of commerce, that it is the problem of finding the break-even point or, as in physics, the point of tolerance.

From the point of view of the classroom teacher the problem has two angles. On the one hand the problem is the psychological problem of individual freedom of action: in what way should individual action be restricted in relation to social needs? On the other, the problem is the social problem of permitting the individual freedom of action for social enrichment, and restricting his action for social comfort. The arguments that used to develop about Dr. Blatz's methods and curricula in child training illustrate the two sides of the classroom problem. Every intelligent and emotionally mature teacher meets the problem and makes a decision respecting it many times a day. The problem is one that every parent has constantly to face. And as we look at those situations involving decisions between assistance and direction at home or school, on the playground, in clubs, or wherever children gather together, we can but conclude that the moment-by-moment decisions are based upon artistic insight rather than upon scientific theorem. From this last statement I should like to take quite a big jump and suggest that educational psychology is frequently, if not always, not the leader but the follower of good pedagogy. Good teachers in the practice of their art have found that certain ways of teaching have beneficial results. Psychology comes along and describes in more general terms what the good teachers have done psychologically and what the psychological results may be.

Following this practice in the examination of our present problem, one is bound to observe the following ways in which good teachers teach.

The good teacher respects the individuality and personality of the child. She does so by respecting his judgement, and shows her respect for his judgement by giving the child an opportunity for choice, encouraging him always to make his own decisions.

Leadership of the teacher is discovered in the pre-selection of the area, and consequently the data within which and from which the child's decisions are made. And of first importance in these prepared situations is the social organization and activity of the classroom. The good teacher eliminates the conflict of competition, except with the child's own goals and standards, and provides instead co-operative action with a social group to which the individual child makes his own contribution in his own way.

By these means the teacher reduces the authority of her own ego, the authority of academic and didactic fact, and the authority of social prejudice. She substitutes for these forms of authority, first, the mutual respect of the pupil-teacher relationship. Second, respect for the propriety of discovered relationships, fitness of things. Two and two make four not because the teacher says so. Two and two make four because the child has discovered a set of relationships that he has made his own. Three, respect for the bonds of the social group. Social compulsion lies in the purposes for which the group exists, and the ends for which the group was established.

It will be observed that by these means the good teacher has created an outward, rather than an inward, flow of noegenetic energy, and thus has helped to create in the child's personality objective, as opposed to subjective, habits of mind. The objective mind is forward-looking and outgoing. It sees itself in relation to the whole. It even objectifies its own self, and in so far as the self may or must be considered in action, it is but one of the objects out of which the immediate pattern or even the life pattern is to be made. The objective mind is thus integrated and secure because it knows itself in relation to the whole. It has a basis for self-appraisal.

The authoritarian, dictatorial point of view in the classroom, on the other hand, turns the mind in upon itself, producing internal conflicts which may often be observed in external explosions.

The cycle of the regeneration of authoritarianism is hard to stop. Authority breeds authoritarianism in its own likeness. Teachers teach as they have been taught. The child is the parent that his father was. I believe, however, that by one means and another, respect for the individual is growing in our own democratic society, and that education is making an invaluable contribution towards achievement of that balance between individual and social needs in which we shall find our own concept of the democratic state.



## TESTING OF DIFFERENCES BETWEEN VARIANCES BASED ON CORRELATED VARIATES

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IN THE TREATMENT of certain statistical problems in the field of psychology one may have to calculate a test of significance for variances that are correlated. For example, we may wish to test whether the variabilities in the intelligence indices of brothers and sisters are similar. As the siblings are related to one another through heredity, a correlation between these indices will likely be present. Again, suppose we have measurements of a group before and after the introduction of an independent variable and are interested in determining if this variable has produced a significant change in the variance. In such a case, one would expect the before-and-after variances to be related or similar in value. In each of these examples and any similar cases of dependent variances, the  $F$  test for homogeneity of variance is not appropriate, since it is based on the assumption that the two estimates of variance are independent.

Unfortunately, this requirement of independence of the two variances has not been made clear in all recent statistics books designed for psychology students. Also, some texts only give the formula for the standard error of the difference between two standard deviations without pointing out that it is an inappropriate statistic where small samples are employed. It is a misleading statistic for small samples because the sampling distribution of the critical ratio of the difference between standard deviations is not normal. Nor do the current statistics texts include any discussion of a method for calculating the significance of the difference between correlated variances based on small samples. This omission, added to the fact that the  $F$  test has been erroneously applied in experimental designs involving correlated variances (for example, 4, p. 26) has prompted the present paper, which aims at describing the correct procedure for determining a test of significance for variances that are correlated.

An early attempt to provide a test of the null hypothesis that  $\sigma_1^2/\sigma_2^2 = 1$  in two samples drawn from a normal bivariate population was that described by Finney (1). However, his test of significance could be applied only when the population correlation was known. Although he showed how this test could be applied when  $\rho$  is unknown, his adaptation was not altogether suitable. The solution to the problem of correlated variances when the population correlation is unknown was given simultaneously by Pitman (3) and Morgan (2) in *Biometrika*. Without going into the derivation of the formulae, certain features of

the Pitman-Morgan test of significance will be noted. This will be followed by an example of the computational procedures involved in making the test of significance.

Using the likelihood-ratio method of approach of Neyman and Pearson, Morgan obtained the following appropriate test criterion

$$R = \frac{s_1^2 - s_2^2}{[(s_1^2 + s_2^2)^2 - 4r^2s_1^2s_2^2]^{\frac{1}{2}}}$$

where  $s_1^2$  and  $s_2^2$  are the two sample variances and  $r$  is the sample correlation between the  $x$ 's and  $y$ 's.

Following quite a different line of approach, Pitman derived a formula which may be rewritten as

$$R = \frac{w - 1}{\sqrt{(w + 1)^2 - 4r^2w}}$$

where  $w$  is the ratio of the two sample sums of squares and  $r$  is the correlation between the observed  $x$ 's and  $y$ 's. Although the two formulae yield identical results, one will find it computationally quicker to work with Pitman's rewritten formula.

To test the hypothesis of a common population variance, one merely tests the correlation coefficient  $R$  for significance by referring

$$t = \frac{R\sqrt{N-2}}{\sqrt{(1-R^2)}}$$

or

$$t = \frac{(w-1)\sqrt{N-2}}{\sqrt{4(1-r^2)w}}$$

to "Student's" distribution with  $N - 2$  degrees of freedom, or alternatively, referring  $R$  to a table of significance values of the correlation coefficient with  $N - 2$  degrees of freedom. It should be noted that the distribution of  $R$  is like that of a sample correlation coefficient.

In the employment of this test, it should be observed that the two variates are assumed to follow a normal bivariate population where the population correlation is unknown. If the true correlation coefficient between the two variables is zero or small, the Pitman-Morgan test is less "powerful" than the  $F$  test. This, of course, follows because the utilization of  $F$  rests on the assumption that the two variables are independent, that is,  $\rho_{12} = 0$ . But when the true correlation is high, the Pitman-Morgan test is more sensitive than the inappropriate  $F$  test.



Before providing a computational example, we may note incidentally that one should keep in mind whether one is making a two-tailed test of significance or a one-tailed test of significance in determining the significance of  $R$ . The hypothesis that the two samples are drawn from a common population with the same variances, that is,  $\sigma_1^2 = \sigma_2^2 = \sigma^2$ , would be considered a two-tailed test of significance. A one-tailed test of significance would involve some hypothesis such as predicting that one specified variable is bound to be more variable than the other, such as  $\sigma_1^2 < \sigma_2^2$ . Naturally, an experimenter in employing a one-sided test of significance of  $R$  must set up his hypothesis before he has observed his data. In making a two-tailed test we refer directly to the 5 or 1 per cent level in the table of significance values of  $t$ . The tabled probability is halved in a one-sided test of significance. This means that the 5 per cent level in a one-sided test of significance corresponds to the 10 per cent level in a two-sided test of significance.

#### COMPUTATIONAL ILLUSTRATION

For an illustration of the Pitman-Morgan test of whether the sample correlated variances indicate any significant difference in parent variance, a small set of data from an unpublished investigation of the author's will be used. A group of 15 children were given two sessions of doll play and the amount of aggression they showed was recorded. The paired aggression scores for these two trials were as follows:

First Session: 9, 8, 8, 7, 7, 7, 6, 6, 5, 5, 3, 3, 3, 2, 1

Second Session: 14, 12, 10, 12, 5, 10, 11, 9, 9, 8, 8, 8, 6, 5, 4

The means for the first and second sessions are 5.33 and 8.73, respectively. The sample variances are 5.95 and 8.35 for the first and second trials respectively. A  $t$ -test applied to the paired scores results in the rejection of the hypothesis that the two samples are from a common population. As the session variances differ somewhat, a point of further interest to the experimenter may be in finding out if the variances are unequal. Since the session variances are obviously dependent, the  $F$  test may not be applied to test for homogeneity of variance. The Pitman-Morgan test should therefore be used to test whether the difference in session variance is significant.

The essential steps in the solution are the computation of the sums of squares and products. The sample sum of squares would be for the first session

$$\sum x_1^2 = 510 - \frac{(80)^2}{15} = 83.33$$

and for the second session

$$\sum x^2 = 1261 - \frac{(131)^2}{15} = 116.93$$

The sums of squares of products is 776. Now the sample  $r$  between the two sessions is readily calculated as .78. Then, by formula,

$$R = 1.40 - 1/\sqrt{(1.40 + 1)^2 - 4(.78)^2 1.40}$$

The resulting  $R$  is .26. On the hypothesis that the value  $R$  is zero, the value of  $t$  is .98 with 13 degrees of freedom. By reference either to the table of  $t$ , or alternatively, to the table of significant values of  $r$ , we see that the observed differences between the session variances are not significant. Hence, the hypothesis of a common population variance is tenable. Therefore, taking into consideration the significant value of the first mentioned  $t$  and the non-significance of  $R$ , we are now sure that it is the population means that differ and not the variances.

#### SUMMARY

It was noted that the utilization of the  $F$  test is based on the assumption that the two variances are independent. This test is, therefore, not applicable to variances that are correlated. If the correlation between the variances is high, the application of the  $F$  test may lead to erroneous conclusions. The proper test for correlated variances is the Pitman-Morgan test which is directed toward testing the hypothesis that two samples have been drawn from a normal bivariate population with a common variance when the population correlation is unknown.

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# EFFECTS OF ELECTROCONVULSIVE SHOCKS ON THE PERFORMANCE OF THE RAT IN THE CLOSED-FIELD TEST<sup>1</sup>

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MANY INVESTIGATORS (1, 2, 3, 5, 7, 9, 10) concerned with the possibility that the electroconvulsive shock therapy used in psychiatric practice may have a harmful effect on intelligence have reported that a series of electroconvulsive shocks impairs learning and retention in the rat. The relevance of these findings for human intelligence may be questioned, since the tasks set for the rat were not directly comparable to those used in measuring human intelligence. The Hebb-Williams (6) closed-field test is not open to this criticism since it measures a capacity in the rat in a manner analogous to that used in measuring human intelligence. Therefore the basic studies on the effect of electroconvulsive shocks on learning and retention in the rat were repeated using the closed-field test.

## METHODS

*Animals.* Hooded rats of the stock maintained by the Royal Victoria Hospital, Montreal, were placed at random in control and experimental groups. Throughout each experiment they were fed wet Purina laboratory chow meal twice daily after each testing period. Quantity of food was adjusted to keep each rat at about 85 per cent of its weight, measured after 24 hours' deprivation.

*Apparatus.* The Hebb-Williams closed-field test was used in the manner described by Rabinovitch and Rosvold (8). Twenty-four problems<sup>4</sup> were used including problems 1-10 of those used by Rabinovitch and Rosvold, and an additional 14 which employed principles calculated to improve the internal consistency of the test.

The shocking apparatus was of the design used by Hayes (5). It had a current-regulating circuit that gave an alternating-current output of 50 milliamperes. Padded alligator-clip electrodes which had been immersed in a sodium bicarbonate solution were attached to the rats' ears and the current was delivered for a duration of one-fifth of a second. This produced a convulsion with pronounced tonic-clonic phases, as described by Golub and Morgan (4). The electrodes were attached to

<sup>1</sup>Some of the material in this paper is from a thesis submitted by J. R. Rishikof in partial fulfilment of the requirements for the degree of M.Sc. in the Department of Psychology, McGill University.

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<sup>4</sup>The design of these problems is available on request from H. Enger Rosvold.

the ears of the control animals, but no current was delivered. The experimental schedule is summarized in Table I. Errors and running time were counted.

TABLE I  
EXPERIMENTAL SCHEDULE

Experiment 1—Initial Learning					
Experimental group N = 15	15 Shocks (one per day)	24 days Recovery	10 days Training	12 days Testing	
Control group N = 14	15 Pseudo-shocks	24 days Recovery	10 days Training	12 days Testing	
Experiment 2—Infant Study					
Experimental group N = 33	10 Shocks (one per day)	74 days Recovery	10 days Training	12 days Testing	
Control group N = 27	10 Pseudo-shocks	74 days Recovery	10 days Training	12 days Testing	
Experiment 3—Retention Study					
Experimental group N = 14	12 days Testing	15 Shocks	24 days Recovery	10 days Training	12 days Testing
Control group N = 13	12 days Testing	15 Pseudo-shocks	24 days Recovery	10 days Training	12 days Testing

### EXPERIMENT 1

The first experiment, termed here "initial learning", employed twenty-nine hooded male rats, mean age 110 days, divided into two groups, 15 in the shock group, 14 in the control group. Fifteen electroconvulsive shocks, one per day, were administered to the experimental group. The control group was handled similarly except that no current was delivered. On the twenty-fifth day after the last shock, preliminary training on the closed-field test was begun. Two observers viewed the performance of the animals each training day, and testing was started when the observers could not distinguish the control animals from the shocked on the basis of "emotionality." Preliminary training was completed by all animals on the tenth day. The 24-item test was then presented, two items per day: one in the morning, the other in the evening.

*Results of Experiment 1.* An analysis of variance of the learning errors of the shocked and control groups resulted in an *F* ratio of 8.69, indicat-

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ing a difference significant at the .01 level of confidence. It may be concluded that a rat's ability in this maze is significantly impaired after a series of 15 electroshock convulsions.

In order to test the relationship between errors and running time in the closed-field test, Spearman Rho was calculated for both shocked and pseudo-shocked groups. The Rho's of .41 and .42 respectively indicate that no significant relationship exists between speed of running and number of errors in the closed-field test.

### EXPERIMENT 2

The purpose of the second experiment was to study the effects of shock on adult test performance when the shocks had been administered in late infancy. The experimental group included 19 males and 14 females, and the controls 14 males and 13 females. They were all chosen at random from a group of 60 infants which were weaned at 26 days of age. One shock per day was given to the experimental group during late infancy—that is, from 20 to 29 days of age inclusive. The controls were treated similarly except that they were not shocked. At 104 days of age all animals began their preliminary training and reached training criterion in 10 days, after which they were run on the 24 test items.

*Results of Experiment 2.* An analysis of variance of the learning errors in experimental and control groups resulted in an  $F$  ratio of .000 indicating that the difference in errors between the two groups is not significant.

### EXPERIMENT 3

The purpose of this experiment was to determine the effect of shock on retention. Twenty-seven adult male hooded rats received the 24 test items in the "closed-field" test in one of six random orders. They were then divided into two groups equated on the basis of their performance, yielding an experimental group of 14 and a control group of 13. The experimental animals received 15 shocks, one per day. The control group was handled in the same manner except that they were not shocked. All animals were allowed 24 days for recovery and 10 days for preliminary training, after which they were presented with the 24 test items in the same random order used in their learning trials.

*Results of Experiment 3.* Table II presents the statistics for a comparison of the savings in errors for the two groups. It may be concluded that a series of 15 electroshocks impairs retention in this test.

### DISCUSSION

The results of this study indicate that a series of electroconvulsive shocks administered to adult rats results in impaired learning and



retention of the Hebb-Williams closed-field test. This finding lends support to those studies which find that electroconvulsive shocks have a deleterious effect on intelligence. Since the closed-field test employs methods similar to those used in human intelligence tests, the generalization that electroshocks impair human intelligence can now be made with

TABLE II  
PRE- AND POST-SHOCK MEAN ERROR SCORES  
Experiment 3—Retention Study

Group	N	Pre-shock mean	Post-shock mean
Shock	14	173.1	150.8
Control	13	186.9	132.4
Differences		-13.8	18.4
Diff. between differences 32.2			
C.R. 2.11			
P value .05			

more confidence than when based only on the results of tests using traditional mazes. That the effect may not be permanent is suggested by the results in the infant group, which was not tested until 78 days after shock. However, the negative findings in this group may be attributed also to the possibility of reversibility of effect in the young animal. Therefore the interpretation of the results in this group is indeterminate.

#### SUMMARY AND CONCLUSIONS

This report has described three experiments to determine the effects on learning and retention in the closed-field test of a series of electroconvulsive shocks.

*Experiment 1—Initial Learning.* Adult hooded rats, administered 15 electroconvulsive shocks, one per day, were significantly inferior to control animals in their performance on the closed-field test 35 days post-shock.

*Experiment 2—Infant Study.* Infant rats from 20 to 29 days of age, were shocked once per day for 10 days. When these rats reached 104 days of age, training was begun on the "closed-field" test. Testing was completed 97 days after the last shock. No difference was found between experimental and control animals.

*Experiment 3—Retention Study.* After preliminary training, 27 adult male hooded rats were tested on six random orders of the 24 test items and placed in control and experimental groups equated on the basis of test performance. Fifteen shocks, one per day, were administered to the experimental animals. Twenty-four days after shock, training on the closed-field test was begun. Testing on the same random order of test items as used before shock was completed 47 days after the last shock. This experiment indicated a significantly greater retention loss in the experimental animals.

The findings indicate that, in rats, electroshocks impair learning and retention of the closed-field test. Since the closed-field test is analogous to the usual procedure for measuring human intelligence, the generalization that electroshocks harmfully affect human intelligence is considered more valid in this study than in those based on the traditional maze problem.

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# THE ROLE OF CULTURAL METAPHYSICS IN PSYCHOLOGICAL THEORY

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## INTRODUCTION

IN ASKING psychologists to take cognizance of metaphysical considerations, one has every reason to expect anything but a hearty welcome. Psychology as a science has had a difficult enough time in extricating itself from departments of philosophy, and to attempt to burden it with any forced liaison with problems of first principles would be quixotic. The aim of this paper is essentially to bring to attention certain factors which markedly affect the forms into which assumptions in theory construction are cast. It is maintained that, in general, there are fundamental "assumptions" made in every culture concerning the structure of reality. These "assumptions," which are to some extent revealed in an analysis of the various language groups, constitute a system of cultural metaphysics. It is felt that the particular metaphysics held in common by users of the Indo-European languages (a group which includes the majority of Western scientists) is one of the most important determinants influencing the structure of current theories.

## CULTURAL METAPHYSICS, LOGICAL POSITIVISM, AND THEORY CONSTRUCTION

Let it be understood that by metaphysics we do not mean what the logical positivist means. Frank (1, p. 290) states that metaphysics is the "direct interpretation of the basic principles of science in terms of common sense or everyday experience." If this is a valid definition of metaphysics then it is certainly a rather useless undertaking, or at best a popularized science, if not science fiction. For the purposes of this article, the term *cultural metaphysics* is closer to the idea of linguistic patterning of experience, or more accurately, the "assumptions" which we tacitly accept in the assumptions we are willing to acknowledge.

In speaking of Einstein, Frank (1, p. 295) maintains that his theories are not products of metaphysics, "for these theories are subjected to the operational or experimental criterion of meaning, though in a more indirect and complex way." However, this does not rule out the possibility that the theories *were* the products of a metaphysics, a quite fortunate one, it seems. Every age probably "proves" its underlying metaphysics in just this way—introducing it at the beginning of a treatise and coming out with it at the end. We may think of Pythagoras and the doctrine of the harmony produced by number "proven" by his laws

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of vibrating strings. Of course this process is not to be deplored, for it is both necessary and fruitful. But let us not deceive ourselves into believing that we have at last, through logical positivism, or some such formal method, killed the horrible dragon of metaphysics. Wherever there is a culture, there also will be found a metaphysics imbuing every aspect of that culture. Naturally, some metaphysical backgrounds are more fortunate than others as far as science-as-we-know-it is concerned. There is nothing ultimate about science; it bears the stamp of the cultural process as surely as our buildings and conversations.

When we record the results of an experiment, we selectively organize our data. This process is of necessity relative to our mode of perceiving the problem. Both the experienced data and the selective organization of them must exist within the framework not only of our biases (which are usually clear to a reader), but within an array of *cultural perceptual assumptions*. We choose some object for investigation from among a wide range of possible objects, but we cannot *justify* this choice on scientific grounds, and so we claim a certain usefulness for the objects we choose to emphasize. If we select these objects it works. What works? A theory. Thus metaphysics is prior to theory.

Granting this state of affairs, metaphysics must not be allowed to operate as an implicit hindrance to theory construction; at least it should be more explicit and thus less a hindrance. I am making essentially the same argument for an awareness of cultural metaphysics that Hebb (2) makes for the inclusion of physiological considerations in psychological theory. We can submerge our physiology or our metaphysics, but then we pay the price by accepting them in less explicit, outworn forms and dealing with them in an inconsistent fashion.

Even traditional metaphysics, if we take the word of many productive scientists, is a positive help in the formulation of problems, and as such has a heuristic value. But it is a sword which cuts both ways, and to mix a metaphor, we might as well wag it as best we can, rather than vice versa.

Turning to the question of intervening variables and hypothetical constructs (5), we may say that in as far as hypothetical constructs are constituents of theory, the foregoing argument applies to them as well. It is likewise applicable to intervening variables, since they are anchored to observable data which are selectively perceived and selectively organized, both of these processes being relative to the array of cultural perceptual assumptions.

In forming a theory, one tries for simplicity. But simplicity exists within a matrix of "assumptions" of assumptions, which are often buried deep in our linguistic patterning. The simplicity striven for may in some

cases be all but impossible, unless we are prepared to alter some of these underlying "assumptions" in the process of constructing a parsimonious theory.

Advances in scientific theory have always had to break down existing metaphysics to a certain extent before becoming acceptable. Indeed, Frank (1, pp. 218-219) points out that Copernicus' theory, as well as Einstein's, was derided as being "mathematically true" but "philosophically false" to "facts." If we abandon the implications of our particular cultural metaphysics in relation to our approach to problems in psychological theory and choose to disregard it or consider it of only specialized interest, then we shall be losing valuable information painfully won.

#### SOME POSSIBLE OBJECTIONS TO A CONCERN WITH CULTURAL METAPHYSICS

At this point it is reasonable to ask whether rooting about in metaphysical conundrums has anything to do with theory *qua* theory. If a theory works and leads to further relations then it is "good"—if not, we try again with a new theory. So why metaphysics? It is true that a metaphysics may underlie our theories and it may at times be an unfortunate one, but science can reduce this to a minimum by making few assumptions, using operational definitions and statistical techniques.

On the surface this appears to be a telling argument. Science operates like some fairy godmother, extricating us from the dark forest of epistemology. But unfortunately we cannot pull heuristic theories out of thin air—we draw from a background of cultural metaphysics. Therefore the study of cultural perceptual assumptions *per se* becomes heuristic. It is a method for outwitting a perverse *Weltanschauung* to some small extent.

A demand for the psychologist to be aware of metaphysical implications in no way implies that we must get at any "essential being" or "reality." Science, since it is neither a mystical experience nor a dogmatic system, must be satisfied with manifestations of any "being," not the nature of "being." Some may object on the basis that science simply does not operate in the fashion prescribed, and that we are trying to establish an untenable relation by fiat. But modern science (especially psychological science) does not pretend to be a completed system; it is clearly in developmental process. Only the ancient sciences could afford to exist as complete (3).

Again, it may be objected that this is a genetic approach to theory, and an attempt to explain the operation of theories by tracing them back to cultural roots. Indeed, such an approach has serious, inherent fallacies. It is an instance of mythological thinking in which one attempts

to explain the present working of things in terms of their genesis. Such a criticism is valid to the extent that we cannot overthrow any theory on the basis of metaphysical considerations alone, nor can we explain theory away on such a basis.

### ILLUSTRATIONS OF CULTURAL METAPHYSICS

We have mentioned the cultural perceptual assumption. Rather than attempting a rigorous definition involving statements about "assumptions" of assumptions, etc., let us quote from Whorf's (6) article "Languages and Logic."

We might isolate something in nature by saying, "It is a dripping spring." Apache erects the statement on a verb *ga*: "be white (including clear, uncolored, and so on)." With a prefix *nō*- the meaning of downward motion enters: "whiteness moves downward." Then *tó*, meaning both "water" and "spring," is prefixed. The result corresponds to our "dripping spring," but synthetically it is: "as water, or springs, whiteness moves downward." How utterly unlike our way of thinking! The same verb, *ga*, with a prefix that means "a place manifests the condition" becomes *gohlga*: "the place is white, clear; a clearing, a plain." These examples show that some languages have means of expression—*chemical combination*, as I called it—in which the separate terms are not as separate as in English but flow together into plastic synthetic creations. Hence such languages, which do not paint the separate-object picture of the universe to the same degree as do English and its sister tongues, point toward possible new types of logic and possible new cosmical pictures.

It appears that simplicity of statement or parsimony of assumptions must be quite dissimilar in Apache and English. Whorf (6) points out that we think of "subject and predicate, actor and action, things and relations between things, objects and their attributes, quantities and operations," due to the structure of our linguistic system. "Embodiment is necessary," the watchword of this ideology, is seldom *strongly* questioned." And again: "We are constantly reading into nature fictional acting-entities, simply because our verbs must have substantives in front of them . . . Hopi can and does have verbs without subjects, a fact which may give that tongue potentialities, probably never to be developed, as a logical system for understanding some aspects of the universe."

Another example we may choose is Lee's (4) analysis of the non-lineality of the Trobriand Islanders' language and approach to the universe. The Trobriand Islander conceives of objects and events as *points*, with *no temporal relations* between them. There is being, but no becoming. There are no adjectives in the language, nor any verb *to be*.

There is no arrangement of activities or events into means and ends, no causal or teleological relationships . . . any deliberately purposive behavior—the kind of behavior to which we accord high status—is despised. There is no automatic relating of any kind in the language. Except for the rarely used verbal it-differents and



it-sames, there are no terms of comparison whatever. And we find in an analysis of behavior that the standard for behavior and of evaluation is non-comparative (4).

We often take for granted that all scientific knowledge consists in demonstrated relations. Many personality and counseling theories assume purposive striving, not to mention our motivational constructs.

As a corollary to this, the Trobriand Islanders appear to us to go to great lengths to codify reality in nonlinear terms.

The line in our culture not only connects, but it moves. And as we think of a line moving from point to point, connecting one to the other, so we conceive of roads as *running from* locality to locality. A Trobriander does not speak of roads either as connecting two points, or as *running from* point to point. His paths are self-contained, named as independent units; they are not *to* and *from*, they are *at*. And he himself is *at*; he has no equivalent for our *to* or *from* (4).

Even the connective *and* does not occur in the language.

This is but a small sample of the implications which the absence of the concept of lineality has in the culture. The implications for both the form and content of psychological theory appear to be sweeping. Even the foregoing sentence implies lineality, for something sweeps through some imaginary space. Nor do the concepts of *form* and *content* appear in Hopi (7). All of these are "assumptions" which are imposed upon us by the structure of the Indo-European languages. They are seldom, if ever, treated as assumptions, but most often as "direct perceptions." Hence our use of the term *cultural perceptual assumption*. A "ridge" of excitation in Brodmann's area 17 does not imply the reality of *lineality as such*.

The lack of temporal connection among objects and events for the Trobriand Islander was noted. With respect to the Hopi, Whorf (8) states:

After long and careful study and analysis the Hopi language is seen to contain no words, grammatical forms, constructions or expressions that refer directly to what we call *time*, or to past, present, or future, or to enduring or lasting, or to motion as kinematic rather than dynamic (*i.e.* as a continuous translation in space and time rather than as an exhibition of dynamic effort in a certain process) or that even refer to space in such a way as to exclude that element of extension or existence that we call *time*, and so by implication leave a residue that could be referred to as *time*. Hence, the Hopi language contains no reference to *time*, either explicit or implicit.

And yet the Hopi language "is capable of accounting for and describing correctly, in a pragmatic or operational sense, all observable phenomena of the universe."

The implications for the psychology of time of this state of affairs are obviously important. But the possibility of a family of psychological



*constructs* excluding the concept of time, and yet accounting for all the facts of human behaviour gives us pause. Phrasing our constructs in such terms would be excruciatingly difficult for most of us. And yet the relations apparent after this translation arising from the logical implications of the language itself may make such a task worth while. But this is merely a peripheral aspect. It is important to note that our "assumptions"—given to us by, among other things, the structure of our linguistic system—may be leading us, in many instances, into unfortunate paths of analysis and pseudo-problems. Not only may we be saddled with pseudo-problems owing to our cultural metaphysics, but also with pseudo-simplicity of statement.

#### SUMMARY

(1) Metaphysics, by which we mean a system of cultural perceptual assumptions, underlies not only theory but the intervening variable as well. (2) For purely pragmatic reasons psychological theorists cannot afford to neglect metaphysics. Submerged, it can be an insidious hindrance; when brought to light an invaluable and hard-won aid in theory formulation. (3) Some possible objections to a concern with metaphysics were dealt with. (4) An attempt was made through examples to clarify the concept of a cultural perceptual assumption.

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## BOOK REVIEWS

*Science and Values.* By JOHN A. IRVING. Toronto: The Ryerson Press, 1952. Pp. ix, 148. \$3.50.

EVERYWHERE today, thinks Dr. Irving, people are asking two questions concerning ultimate values. First, can science supply us with satisfactory moral standards? Secondly, are moral standards universal or relative? His view is that neither psychology nor the social sciences can provide such standards. He examines and rejects two historic theories of the Good for which an empirical and scientific basis was claimed, namely, Utilitarianism and Evolutionary Ethics. Also weighed and found wanting are Existentialism and Kallen's version of Pragmatism. The author believes, however, that philosophy has succeeded in formulating two such standards, the principle of *Justice*, that we should always act in such a way that we would be prepared to universalize our action, and that of the *Supreme Worth of Personality*, that we should always treat other people as ends rather than means. But these two principles are extremely general and abstract. To the social sciences and psychology falls the indispensable task of determining the conditions under which these values can be realized in everyday social life. The social psychologist has a substitute for laboratory experimentation in the comparative method also employed by cultural anthropologists. By instituting comparisons between human cultures, social scientists can vary the conditions under which a social phenomenon occurs, eliminate irrelevancies, and discover the essentials. In this way they can investigate the adaptations the individual makes to his social environment, and the different ways it determines his personal responses. But if the situation in which values now function is to be understood, the author holds that the comparative method must be supplemented by a mobilization of the data of psychology and the social sciences on an unprecedented scale. A new outlook is required, in which social facts are given a central place in a liberal education. Also included in this volume are a chapter on "Philosophical Trends in Canada," and brief reviews of recent writings on the present social crisis by Pribram, Sorokin, and others. It is a book which people with an enlightened interest in the social and political issues of our day should find stimulating and helpful.

H. W. WRIGHT

Kitchener, Ont.

*Our Age of Unreason.* By FRANZ ALEXANDER. New York: Lippincott Company, 1951. Pp. 338. \$4.50.

THIS BOOK, like the previous edition, adds a new slant to the psycho-analytical view of life. The theme of the book is best summarized in the author's own words:

One central theme has given cohesion to our discussions, two fundamental dynamic principles which have been applied in all three parts of this book: the principle of surplus and that of inertia. Man grows until he can add to his system the surplus of intake over expenditure; after he has reached the limit of maturity he makes creative use of his surplus energy. This principle, the creative expenditure of surplus energy, is the basis of biological reproduction, love and social change. Through his creative activities—inventions and pioneering of all sorts—man continuously changes the world in which he lives, but then has to face the problem of adapting himself to the new order he has created. In this he has to struggle against the other basic dynamic principle of life: his inertia, the inclination to continue to live according to automatisms, habits and traditions acquired earlier. His instrument for adaptation is his intellect, which grasps the new situation and finds the required changes in his behaviour. His inertia makes him adhere to older adaptations, and because these no longer satisfy his needs, he is frustrated and is forced to make new efforts and use his intellect for readjustment.

Although it is not an authoritative text for academic psychologists, it does contain a number of insights into human behaviour which are of value not only to the intelligent layman, but also to the scientist in so far as it relates a vast array of data concerning individual and group behaviour in a rather consistent framework.

A. S. LUCHINS

*McGill University*

*The Sexual Perversions and Abnormalities.* By CLIFFORD ALLEN. Toronto: Oxford University Press, 1949. Pp. x, 346. \$5.00.

IN THIS compact volume the author has integrated much information concerning the explanation of sexual deviations from several fields of investigation. He has drawn upon biology, experimental psychology (particularly researches in conditioning), neurology, psychoanalysis, and other disciplines in the search for information which would help to explain these deviations. Emphasis is placed particularly upon two avenues of investigation, namely, psychoanalysis and "conditioning." The author puts it this way (p. 59):

Again, whether the abnormal modes of expression are fundamentally erotic as Freud and the psychoanalytical school insist, or whether they are merely patterns of behaviour which become sexually conditioned through environmental circumstances we do not yet know for certain, nor does there seem to be any way of proving it.

The classification is founded upon a division of the instinct into its stimulus, mode of expression, strength of urge and object. The author

writes (p. 57), "In the sexual perversions it is the modes of expression and the objects which are at fault." The author has succeeded in developing a clear and comprehensive classification upon this basis. He uses the object as the descriptive and the mode of expression as the sub-term. For example, he speaks of "heterosexual sadism" for the cruelty of men to women, "homosexual sadism" for the cruelty of men to men, etc. Within this classification a number of chapters are then devoted to a description of the various forms of sexual deviation. The description includes the definition, psychopathology, and occurrence. These descriptive chapters are illustrated with many examples drawn, in some cases, from real life, and in some cases from the classics. The reader will be impressed with the success which the author has achieved in including material relating to the relatively rare forms of deviation in a short space. Two chapters are devoted to a discussion of representative cases. In the presentation of a case the factual material is set out, followed by the analytical and interpretative data. This arrangement is likely to meet with general approval. The chapter which deals with prevention and treatment stresses the psychological aspects of therapy. There are some provocative paragraphs, and the author's statement (p. 283) that, "continence is definitely harmful" will not find universal acceptance. The concluding chapter, which deals with the medico-legal aspects of the subject, has limited value in that the material is based upon criminal law in the United Kingdom which differs in some respects from the law in other jurisdictions.

This volume may be characterized as a concise but comprehensive exposition of the etiology, classification, and treatment of the sexual perversions.

K. G. GRAY

*University of Toronto*

*Manic-Depressive Psychosis, and Allied Conditions.* By LEOPOLD BELLAK (with BLAISE PASQUARELLI, ERNEST PARKES, and SONYA SOREL BELLAK). Toronto: Ryerson Press, 1952. Pp. xiii, 306. \$11.75.

THIS BOOK reviews the psychiatric and psychological literature dealing with manic-depressive psychosis. Some reviews present critical evaluation and interpretation, others only summarize the various studies. Dr. Bellak's intention was merely to summarize, to "*mention the existence*" of this or that study of the affective disorders. This he has succeeded in doing. Over a thousand studies, including many published in Europe, have been summarized in the space of about 230 pages. Each of the fifteen chapters deals with a different aspect of the psychosis, such as

vital statistics, etiology, physiological studies, treatment, involutional psychosis, etc. Unfortunately, each study is described in its own phraseology, which often makes it difficult to comprehend immediately the full significance of a group of studies dealing with the same problem. A thirteen-page Introduction is devoted to the author's "multiple-factor psychosomatic theory of manic-depressive psychosis." This theory interprets the affective psychosis (and schizophrenia) in terms of the relative strengths of "libidinal forces" and "ego functions." In the opinion of the reviewer, Dr. Bellak's formulation, notwithstanding its optimistic tone, fails to present any definite theoretical advance. The book would have suffered little in the omission of this section.

The researcher is always glad to see a review of relevant literature, and there is no doubt that Dr. Bellak and his collaborators have done a great service to the student of psychoses in providing this handy and useful reference work. Practising psychiatrists also have much to gain by reading through the mass of studies reported here. But for all its usefulness to the research worker and the practitioner, one cannot help feeling that, with very little further effort, devoted to critical analysis and interpretation, this book could have been turned into an important guidepost to the understanding of manic-depressive psychosis.

DALBIR BINDRA

*McGill University*

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